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Understanding the Perceptions, Preferences, and Attitudes towards Investment through Digital Platform of a Big, Growing, and Young Customer Segment in Indonesia

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DERY HEFIMAPUTRI
ISHMAIL KAMARA

Department of Technology Management and Economics
Division of Science, Technology, and Society
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DERY HEFIMAPUTRI
ISHMAIL KAMARA

Tutor, Chalmers: Erik Bohlin

Department of Technology Management and Economics
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Department of Technology Management and Economics
Division of Science, Technology, and Society
Chalmers University of Technology
SE-412 96 Gothenburg, Sweden
Telephone: + 46 (0)31-772 1000

Chalmers digitaltryck
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Abstract

The hype of digitalization has impacted several industries including finance. Several innovations have been launched such as robo-advisory investment platform which minimize the involvement of human in investment process. One of the companies that provides this service is company X which is based in Indonesia. On the other hand, there is a growing new segment which is projected to increase tremendously and is called 'the billion dollars consumers'; muslim millennials. Company X aims to serve this growing segment thus understanding their needs and values become crucial aspect.

In this work, the researchers used quantitative methods and statistical analysis to study the behaviors of Indonesian Muslim millennials. The relation between financial literacy, Islamic financial literacy, and investment behavior is studied using factor analysis and t-test analysis. Online questionnaire was deployed to 379 respondents and analyzed further.

Findings suggest that in average both financial and Islamic financial literacies of the respondents are 58,5% and 54,3% respectively thus cannot be classified as sufficient. However, investors tend to have significantly higher financial literacy score than the non-investor group. In addition, the findings highlighted that investment decisions are driven mostly by religious beliefs and firm image, whereas digital solution is also seen as preferable and important. Consequently, the findings from this work will provide inputs for companies that are contemplating on targeting their goods at the fast-growing Indonesian Muslim millennials population.

Keywords= Financial literacy, islamic financial literacy, muslim millennials, robo-advisory investment platform, investment behaviour.

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Dery Hefimaputri

Ishmail Kamara

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Chapter 1 – Introduction

This chapter will explain about the background of the study including the study aims, objectives, study outline, limitations, and ethics.

1.1 Background

The hype of digitalization reaches numerous sectors including finance. With more and more people connected through the internet and evolving information technology, conventional approach of doing financial services is challenged, including the way people invest their money, Online investment platforms using robo advisory technology is one of the growing opportunities.

Company X is a financial technology startup based in Indonesia that creates online investment platform using robo advisor technology that aims to make investment processes easy to access by integrating financial planning services to investment options. Now, the company wants to expand its business to a targeted segment; Muslim millennials, firstly within the country. This segment embodies compelling characteristics such as fast growing, young, and large in amount with increasing interest in digital-based solutions (Reuters, 2016). Moreover, a study from Pew Research Center also indicates that this segment views belief-compliant products as important which can open the door for further development of Islamic finance services to serve their needs (Diamant, J., & Gecewicz, C, 2017).

However, very few studies have been conducted to understand the dynamics of this growing segment. Therefore, this study is geared towards understanding their perspectives, preferences as well as their attitudes with regards to online investment platforms.

1.2 Aim

The purpose of this study is twofold: firstly, to contribute in gaining a deeper understanding regarding Muslim millennials and its relationship with financial literacy, Islamic financial literacy

and investment behavior. Secondly, to use knowledge from the findings as input to help the company to get a clearer picture of the customers' concerns to better address their needs.

1.3 Objectives

Several objectives of the study are explained below.

i) To elicit perceptions and attitudes of Indonesian Muslim millennials with regards to investment and online platforms.

ii) To identify the different preferences of Indonesian Muslim millennials with regards to investment and online platforms.

iii) To evaluate the financial literacy and Islamic financial literacy of Indonesian Muslim millennials.

iv) To ascertain the correlation between financial literacy and Islamic financial literacy in the context of investment.

1.4 Study Outline

The study will be done with the help of quantitative research wherein a segment of the Indonesian Muslim population will be investigated. The segment on which attention will be directed is the Muslim millennials group. Questionnaires will be designed in line with the aims and objectives of the study and administered online. The subjects will be responding to the questionnaires which consist mainly of close-ended questions. The responses will be recorded, analyzed and interpreted using statistical methods. The researchers will employ Excel and SPSS for enabling and ensuring proper handling of the data and eventually accuracy in any results obtained.

1.5 Research Questions

In order to reach the aim of the study, several research questions are formulated. The research questions are designed to understand about the financial literacy and Islamic financial literacy of the target market since the study regarding this segment and its relation to financial literacy and especially Islamic financial literacy is still scarce. Moreover, the relationship between financial

literacy, Islamic financial literacy and investment activity is also studied to confirm several theories regarding this matter. Finally, deeper look on factors affecting investment decisions is also studied to help the company better address the targeted customers' problem and needs. Research questions formulated are described below.

RQ1= *How is the financial literacy and Islamic financial literacy of Indonesia's Muslim millennials?*
RQ2= *Is there any relationship between financial literacy, Islamic financial literacy, and investment decisions of Indonesia's Muslim millennials?*
RQ3= *What are the most influential factors affecting investment decision in Indonesia's Muslim millennials?*

1.6 Hypothesis for the Survey

According to survey by Klapper, et al. (2015), only 32% of adults in Indonesia is financially literate, which is much lower than the developed countries such as Sweden 71%, the United Kingdom 67%, and Demark 71%. Therefore, our first and second hypothesis are that the financial literacy and Islamic financial literacy of the respondents are inadequate as mentioned below.

H1= *The financial literacy of Indonesia's Muslim millennials is below the adequate level (<67%)*
H2= *The Islamic financial literacy of Indonesia's Muslim millennials is below the adequate level (<67%)*

Several factors affecting investment are mentioned in several studies especially regarding its relation to financial literacy and Islamic financial literacy (Antara, Mussa, Hassan, 2015; Al-Tamimi and Kalli, 2006; Abdullah and Anderson, 2015). However, there is still scarce information regarding this matter that focus on the target's segment which is Indonesia's Muslim millennials. Therefore, hypothesis three, four, and five are formulated as described below.

H3= *There is a significant difference in financial literacy rate of Muslim millennials that already commit to do investment and not*

H4= *There is a significant difference in Islamic financial literacy rate of Muslim millennials that already commit to do investment and not*

H5= *Religious reasons and digital solutions are the most influencing factors of investment behaviour among Indonesia's Muslim millennials*

1.7 Limitations

The research will be done online, and it means that probability sampling is difficult to be done. As the implication, the generalizability of the study result might be limited. Moreover, even though online surveys give several benefits such as convenience and ease in getting bigger responses, the researchers might face some challenge in ascertaining whether the respondents' responses will reflect their attitudes, preferences and attitudes. Some qualitative research might be needed to get a deeper perspective and validate the findings.

1.8 Ethics

It should be noted that the researchers in this study are cognizant of research ethics and have strictly adhered to them during their investigation. Since the respondents must deal with an online questionnaire and so do not have to come in direct contact with the researchers, to allay the concerns of the latter, special importance is attached to the ethics. By consent it means the subjects must understand that they are participating in the research and that the research requires some information from them.

Chapter 2 - Theoretical Framework

This chapter will elaborate on several theories that form the framework within which the study is carried out. Indonesian Muslim millennials, financial literacy, Islamic financial literacy and some statistical methods, will serve as the lenses through which the results of this work will be viewed.

2.1 Muslim Millennials

Generation M theory is used to help build the conceptual framework. Janmohamed (2016) through her book, ‘‘Generation M: young Muslims changing the world’’, stated that Muslim millennials have similar characteristics globally which is they value modernity and faith equally, they are tech savvy and highly adopt digital solutions. They value modernity and faith equally and believe both aspects can go hand in hand (Ibid). According to Ogilvy research, 90% of young Muslims purchase products that are according to their faith (Janmohamed, 2016)

Muslim millennials are huge in number and fast growing (Janmohamed, 2016). Muslim middle class, with most of them are within millennial age, is expected to triple from around 300 million in 2015 to 900 million by 2030 (Janmohamed, 2016). Ogilvy Noor, an Islamic brand consultancy firm, has forecast that Muslim consumer lifestyle market will expand rapidly to reach US$2,6 trillion by 2020 and is called ‘the next billion-dollar consumer’ (Chow, 2016). As in Indonesia itself, Muslim accounted for most of the population which is 87,2% of its citizens making it the most populous Muslim country in the world (Badan Pusat Statistik, 2010). As this work is done in the Indonesian context, the focus will be on Indonesian Muslim millennials.

2.2 Islamic Finance

There are several elements that make Islamic finance different from the conventional approach of finance. Islamic finance must be in accordance with specific guidance of Islamic values which is known as sharia. First rule is the prohibition of interest (*riba* in Arabic). Interest or *riba* in Arabic is defined as excess of initial capital required in a business transaction without equivalent value in exchange that is justified by sharia whether it is small or big (Mihajat, 2018). For example, when A lends €100 to B for 3 months, A is not allowed to ask B for more money than the amount B owes. There is a fundamental difference with the conventional banking system where banks charge

lenders a certain percentage of their loans. However, Islamic finance has their own way of financing business or industries mostly with buy and sell transactions and not interest based.

Islamic finance also prohibits uncertainty (*gharar* in Arabic). Uncertainty here is defined as danger or exposure to hazard, risk, and undisclosed (Mihajat, 2018). Uncertainty may arise in the form of not clear contract of the subject matter, uncertainty in the time of payment, uncertainty in the quality and quantity of the subject, uncertainty in ownership, and so on (al-Saati, 2003, & Ayub, 2007).

Another thing that is prohibited is gambling (*maysir* in Arabic). Maysir is translated as easy, which means easily available wealth or game of chance or accumulating wealth by chance without acknowledging harm for others or other people's rights. By definition, gambling in Islamic finance can be defined as any transaction conducted by two parties which will give benefit to one party and harm the other by linking a particular transaction with an act or event (Al-Suwailem, S., 2006).

Several studies found that religiosity and financial knowledge have significant impact on financial behaviour (Lajuni et al, 2018). Study conducted by Shweder (1991) showed that religion has high influence on people's attitudes, values, and behaviors both at the individual and societal level. Furthermore, study from Al-Tamimi & Kalli (2006) which is conducted to UAE individual investors found that religious reasons is the most influencing factor towards investment decision. As in Indonesia itself, sharia stock market grew 92% in 2018, as mentioned by Head of Sharia Stock Market in Indonesia, Irwan Abdalloh (Tari, Dwi., 2019)

2.3 Financial Literacy

Several researches have been conducted regarding financial literacy, however there is no universal understanding of what financial literacy is (Huston, 2010). Huston (2010) did a research regarding measuring financial literacy, wherein she studied financial literacy literatures available and proposed financial literacy conceptual framework. Financial literacy can be understood as how well an individual understands and use personal finance-related knowledge (Huston, 2010). Thus,

financial literacy has two dimensions which are financial knowledge (understanding) and personal finance application (use).

Huston (2010) compiled on her study that during the last decades, literatures regarding financial literacy have at least four distinct content areas. First is money basics including time value of money, purchasing power, and personal finance accounting concepts. Second content is borrowing which is understood as bringing future resources to the present time using various ways such as credit card, loans, and mortgages. Third content is investing which is securing present resources to the future using various means such as saving accounts, stocks, bonds, and mutual fund. The fourth content area is protecting resources such as using insurance or other risk management techniques.

Financial literacy measurement has also been studied by several scientists before and most of them are quite basic. Byrne (2007) measures investment knowledge using only four questions, Alexander et al (1997) by just using nine questions related to mutual funds, Volpe et al (1996) relying on ten questions. Al-Tamimi and Kalli (2006) developed a comprehensive exam-type assessment that covers the main aspects of investment managements.

Financial literacy affects financial decisions (Hung, 2009). Financial knowledge affects financial behaviours (Xiao et al., 2009). Financial literacy might be used to predict financial behaviours or outcomes, but other characteristics such as impulsiveness, unusual preferences, external circumstances and so on, might affect the final financial decision making (Huston, 2010).

2.4 Online Investment Platforms

Volpe et al (2002) suggested that online investors should have more knowledge than offline investors to succeed in the securities market since they are more likely to be surrounded by manipulations and false information. That author also examined several different demographic backgrounds and their relation to financial literacy. The study found out that level of financial literacy varied among people's education, experience, age, income, and gender. People with higher education and higher income were found to be more financial literate as well as people engaged in online trading. Women are also reported to have lesser financial literacy rate and older participants

also performed better than younger participants. Similar study conducted by Lusardi, et al. (2010) indicated that there is a varied financial literacy rate among people with different education level, employment status, age, and relationship status.

2.4.1 Robo-Advisors

Fein (2015) described the robo-advisor as any of a growing number of internet-based investment advisory services aimed at retail investors that have emerged in the financial market place recently. Up to the time of Fein's article, such services as those offered by the robo-advisor had existed and were targeted at particular customer bases. According to Fein (2015), robo-advisors have appeared as a viable alternative for small investors who are comfortable with the application of internet technology but want the reassurance of an investment adviser to guide them. Robo-advisors offer investment advice and discretionary investment management service without the intervention of any human adviser with the help of algorithms and asset allocation models advertised as tailored to suit everyone's investment needs. Fein had also expected more robo-advisors to emerge in the future based on the increase in their use.

According to Faloon and Scherer (2017), robo-advisors represent a novel and interesting development in the digitalization of asset management. They have the potential to establish a new standard in fiduciary client advice and become the model of preference for passive investors.

2.4.1.1 Features of Robo-advisors

Robo-advisors have been instrumental in facilitating online investments. They offer advice based on a user's responses to questionnaires that can be filled out online (Fein, 2015). The questionnaires are designed to obtain information from the user in order to establish basic risk parameters and investment preferences (Ibid). However, the robo-advisor does not elicit complete information on the financial situation of the user (Ibid).

Robo advisors provide services through online interfaces or platforms. One of the key characteristics of robo-advisors is the direct contact between them and the investors (Ibid). The process requires no human intermediary hence they are designed to avoid the necessity of a personal advisory relationship with the user (Ibid).

2.5 Measurement of Variables

Variables examined in the study such as financial literacy, Islamic financial literacy, and investment preference are built upon some established theories mentioned below.

2.5.1 Financial Literacy

Financial literacy will be measured using established framework from Lusardi and Mitchell (2006). Lusardi and Mitchell (2006) proposed a financial literacy measurement using two set of questions that focus on basic financial knowledge and more advance financial knowledge. First part of the questionnaire will measure basic financial knowledge which is related to the role of interest rates, the effects of inflation, and risk diversification concept. The second part of the questionnaire will assess a more advance financial knowledge regarding concept of risks and returns such as how stocks, bonds, and mutual funds work and basic asset pricing. This assessment tool is widely used by other researches and even institutions since it tackles the challenge in doing a survey which is how to adequately assess respondent with only a handful set of questions. Their study has been used several times by other researchers or even institutions such as Dutch DNB Household survey and US survey (Lusardi and Mitchell, 2011) to assess financial literacy either originally or partly modified.

Furthermore, suggestion from Huston (2010) which have had reviewed most of financial literacy measurement in the past decades will be taken which are categorizing financial literacy in four aspects ranging from time value of money, borrowing concept, investment/savings, and protection concept. The exact wording for the assessment is as follows.

I. Basic financial literacy (Lusardi and Mitchell, 2006)

   1. " Suppose your savings account contains $100 while at that moment the interest rate was 2% per year. What would happen to the amount of savings after 5 years? Exceeds ***$102****, still the same $102, below $102?"*

   2. " If the interest rate of your savings account ws 1% annually while inflation rate was 2% per year. What will happen to your purchasing power? Can you buy more with the money in your savings account, or you only can buy ***less*** *than today with the money on that account, or still the same?"*

3. "What do you think about the accuracy of this statement, 'Usually it is saver to buy a single company stock rather than a stock mutual fund."Is that statement ***false*** *or right?*

II. Financial literacy - Advanced knowledge (Lusardi and Mitchell, 2006) with slight adjustment in point number 6.

4. Function of Stock Market

"The following statement explains the main function of stock market. (i) Stock market is useful to predict stock earning; (ii) Stock market resulting in an increase in stock price; ***(iii) The stock market help to bring people who want to sell and buy stocks****; (iv) None of the above; (v) Do not Know; (vi) Refuse to answer*."

5. Knowledge of Mutual Funds

"Choose the correct statement. (i) When someone invests in mutual fund, the investment cannot be withdrawn during the first year.; ***(ii) Mutual funds are able to invest money in several instrument such as stocks and bonds.;*** *(iii) Mutual funds will pay a guaranted amount of return depending on the historical performance; (iv) None of the above; (v) DK; (vi) Refuse.*"

6. Relationship Between Interest Rates and Bond Prices

"If the interest rate falls, what should happen to bond return? (i) Rise; (ii) Fall; ***(iii) Stay the same****; (iv) None of the above; (v) DK; (vi) Refuse*."

7. Risk Diversification: Company Stock or Mutual Fund?

"Choose whether this statement is correct or false? Usually buying stocks from a single company gives a safer return than a stock mutual fund. (i) True; ***(ii) False;*** *(iii) DK; (iv) Refuse."*

8. Riskier: Stocks or Bonds?

"Is this statement true or false? 'Normally, stocks are riskier than bonds'. ***(i) True;*** *(ii) False; (iii) DK; (iv) Refuse."*

9. Long Period Returns

"After a long period of time such as 10 or 20 years, which asset normally gives the highest return? (i) Savings accounts; (ii) Bonds; ***(iii) Stocks****; (iv) DK; (vi) Refuse*."

10. Highest Fluctuations

"Choose asset that normally has the highest fluctuations over time (i) Savings accounts; (ii) Bonds; ***(iii) Stocks****; (iv) DK; (v) Refuse."*

11. Risk Diversification: Spreading Money Among Different Assets

"When an investor spreads his money among different assets, the risk of losing money is: (i) Increase; ***(ii) Decrease****; (iii) Stay the same; (iv) DK; (v) Refuse*."

2.5.2 Measurement of Islamic Finance Literacy

Islamic finance knowledge is assessed through the proposed measurement for Islamic finance literacy from Antara, Musa, and Hassan (2015) which consists of 17 questions with true/false type of answer with option to choose 'I don't know' to avoid bias of the answer. The content of assessment is focus on the main difference between conventional and Islamic financing method. This tool can be beneficial since it provides guidelines on assessing Islamic financial literacy. However, this tool is focus more on Islamic literacy related to business knowledge instead of personal financial knowledge. Therefore, this framework will be adopted partially to better suits the Muslim millennials respondents. Items which are more relevant to business actors are not used during the survey, leaving the items to 8 questions. Moreover, the assessment tools is adjusted to Indonesian market (the currency).

Table 2. 1 Islamic Financial Literacy Measurement

Code	Items	True	False
IFL01	Islamic method of finance is interest-free	v	
IFL02	Uncertainty and deception (Gharar) are not allowed in Islamic finance	v	
IFL03	Buying shares on a short-term price fluctuation is not a speculation		v
IFL04	Preservation of wealth is one of the objectives	v	
IFL05	It is allowable to sell a commodity before it comes		v

	under our control		
IFL06	In musyarakah, a partner who invest for the capital has right to specify from beginning the amount of his/her profit		v
IFL07	In profit-sharing investment methods (mudarabah), the capital provider is the only party that bears the losses	v	
IFL08	In benevolent loans (quard Hassan), the borrower is required only to repay the original amount of the loan	v	

2.5.3 Financial and Islamic Financial Literacy Classification

There is no universal agreement on how to classify financial literacy grading, and Islamic financial literacy. Mandell (2009) used 75% as threshold to say its respondents are financial literate. Whereas survey conducted by JumpStart, respondents are perceived as failed if they got a score below 60% (Mandell, 1997). As the status from 60-74% remains unclear. In this study, the in-between number which is 67% will be used to classify the respondent financial literacy rate as adequate. If the maximum score which is 100% is divided into three parts which are low, moderate, and high, we can find that 67% is the minimum number to categorize high financial literacy score, as well as for Islamic financial literacy.

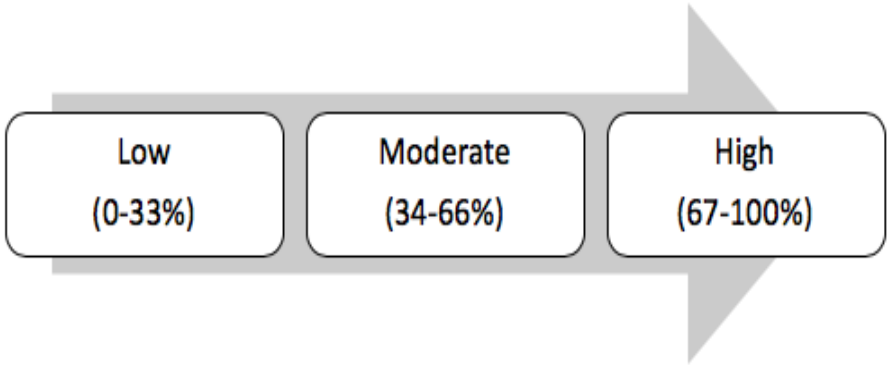

Figure. 2 1 Financial and Islamic financial literacy classification

2.5.4 Investment Preference

In this section we would like to know the factors behind investment decisions for respondents. Furthermore, the respondent also will be asked about their attitude and preferences toward investment using amended framework used by Abdullah and Anderson (2015), Al-Tamimi and Kalli (2006). This modified questionnaire consists of 15 items.

Table 2. 2 Investment Preference Measurement

No	Variables	Source	Items
1	Sharia-compliance	Al-Tamimi and Kalli (2006)	I will only invest my money in a place that I believe that is in accordance with sharia
2	Religiosity	Al-Tamimi and Kalli (2006)	I follow strict adherence to religious rulings
3	Conformance to sharia	Al-Tamimi and Kalli (2006)	I always checked on the permissibility of any products before buying
4	Trust to religious institution	Abdullah and Anderson (2015)	I believe in the halal compliances of the investment products certified by DSN MUI
5	Conformance to religious authorities' decision	Abdullah and Anderson (2015)	I always checked for certification from DSN MUI before conducting investment
6	Trust in sharia system	Abdullah and Anderson (2015)	I believe both conventional and Islamic products are different.
7	Trust to financial authorities	Al-Tamimi and Kalli (2006)	I will not sign up in any online platform without license from financial authorities
8	Reputation of the firm member	Al-Tamimi and Kalli (2006)	I carefully see the firm board members before choosing an investment vehicle

9	Reputation of the investment firm	Al-Tamimi and Kalli (2006)	Reputation of the investment firm is important
10	High return	Al-Tamimi and Kalli (2006)	I'm considering using investment options that can give high returns even though it is not according to sharia law
11	Get rich quick	Al-Tamimi and Kalli (2006)	I aim to "get rich quick" by conducting investment
12	Affordable	Al-Tamimi and Kalli (2006)	Affordable investment is important
13	Online investment	Janmohammed (2016)	I prefer to do investment through online access
14	Digital based finance	Janmohammed (2016)	I prefer digital solution to my financial activity
15	Online platform	Janmohammed (2016)	I've invested my money through online platform

2.5.5 Investment Attitudes

Huston (2010) elaborate several points related to financial application dimension such as action towards investment in stocks, mutual funds, government bonds, preparation for retirement, budget planning, and protection concept.

Table 2. 3 Investment Attitudes Measurements

No	Elements
1	I invest my money on regular basis

2	I've invested mutual funds
3	I've invested my money through stocks
4	I've invested my money through peer to peer lending
5	I've invested my money through bonds / sukuk (Islamic obligations)
6	I consistently put aside some percentage of my income for retirement savings
7	I stick to my budget planning before spending money

2.6 Sampling Techniques

Sampling is widely used to gather information regarding population. Sampling techniques determines how researchers take samples from populations with aim to have a better estimation at low cost, less time and great precision (Kish, 1965). There are many sampling techniques that can be used in a research, several of them will be explained below.

- Purposive sampling

  In this type of sampling, the respondents has been assigned in advance according to the study purpose. This technique only applicable for some specific research (Singh and Masuku, 2014)
- Simple Random sampling

  In this type of sampling technique, each respondent has equal change to be selected as the sample. This technique provide unbiased and better estimation of parameters if the population is homogenous (Singh and Masuku, 2014)
- Stratified Random Sampling

  In this type of sampling, respondents are classified into several homogenous group or 'strata', and then the sample are drawn randomly within these groups.
- Convenient sampling

  Convenient sampling is also known as Haphazard Sampling is part of non-probability sampling where respondent that meet practical criteria such as proximity, availability at some given time, willingness to participate are included to the study (Etikan, et al. 2016).

This type of sampling might have some limitations regarding generalizability, but at some researches this sampling technique might be useful especially if the population is very large or when time and cost are concerned.

2.7 Statistical Tools

Statistics are used to make conclusions about population of interest while the data only applicable from a sample. In this study, several statistical tools will be deployed such t-test and factor analysis. Several basic assumptions might be needed before these types of analyses can be used.

2.7.1 T-test Analysis

T-test analysis was introduced back from 1908 by Willian Sealy Gosset and is mainly used to compare two average means and how different they are from each other's (Fisher Box, Joan., 1987). There are several types of t-test such as independent t-test, paired sample t-test, and one sample t-test (Weisstein, Eric. W.). Independent t-test is used when the study is designed to compare means of two groups, by using t-test the significance of the two-score result can be detected. The next type is paired sample t-test which is used to compare means of the same group at different time. For example, if the research wants to see an effect after the respondent taking a medicine and before, this type of test can be conducted. The third type is one sample t-test which is used when the study wants to compare the mean between the sample to a known number. By using one sample t-test the study can show whether there is a significant difference of the sample to that certain number or not.

2.7.2 Factor Analysis

Factor analysis is a multivariate statistical procedure with several usage. Firstly, it can be used to reduce several numbers of variables into a smaller set of variables which is also referred as factor (Williams, Onsman, and Brown, 2010). Secondly, it may help refinement of theory by establishing underlying factors between observed variables and latent construct (Ibid). Thirdly, it can be used to validate a construct of self-reporting scale (Nunnally, 1978).

In general, there are two types of factor analysis which are Confirmatory Factor Analysis (CFA) and Exploratory Factor Analysis (EFA). CFA is used when the study conducted want to test an established theory or model. On the other hand, in EFA the researcher explores the variables without prior expectation regarding the number or grouping of the variables.

Widarjono (2010) mentioned about three steps on doing a factor analysis which are measuring correlation between observed variables, factor extractions, and factor rotations. Preliminary work is needed to determine the sufficiency of sample, one of methods to determine this aspect is Kaiser-Meyer-Olkin (KMO). The higher the KMO score, the more suitable factor analysis to be conducted. The minimum KMO score before conducting factor analysis is 0,5 (Wirdjono, 2010).

The next step is extraction methods. There is several ways to do factors extractions (Hair, et al, 2009).

- Principal Component Analysis (PCA)
  Principal Component Analysis is a data reduction technique which useful to summarize the variance in a set of variables into fewer dimensions (Hair, et al, 2009). In this method linear combination from observed variable is formed whereas the primary component is the combination of factors with the highest variance.
- Common Factor Analysis
  In this method, factors are being estimated by its common variance. This method can be useful if the purpose of the study is to identify underlying dimensions and common variance.

The third step is factor rotations. One of the main results from this process is factor pattern matrix. Factor matrix contains coefficient that is used to express standardized variable in a factor. Factor rotation is beneficial to simplify the factors and thus make the interpretation process easier. There are some methods to do factor rotations such as varimax methods, promax methods, quartimax methods, and so on.

Chapter 3 - Methodology

This chapter will explain about the methodology of the research including research design, research question, and hypothesis formulation.

3.1 Research design

Proposed theoretical framework regarding acquisitions of Islamic finance by Antara, Musa, and Hassan (2015) suggests that the decision to use Islamic financing method or not is affected by Islamic financial literacy and other factors such as subjective norms and skills. Other studies also mentioned that financial literacy affects financial decisions and financial behaviours (Hung, 2009, Xiao et al., 2009). Furthermore, Huston (2010) stated that financial literacy might be used to predict financial behaviours or outcomes, but other characteristics such as impulsiveness, unusual preferences, external circumstances and so on, might affects the final financial decision making. Thus, in this study, financial literacy and Islamic financial literacy will be studied in terms of their relation to investment behaviour as well as other factors that may influence the investment decisions as described in Figure 1. Financial literacy will be measured using tool proposed by Lusardi and Mitchell (2006) whereas Islamic financial literacy will be assessed through framework proposed by Antara, Musa, and Hassan (2015).

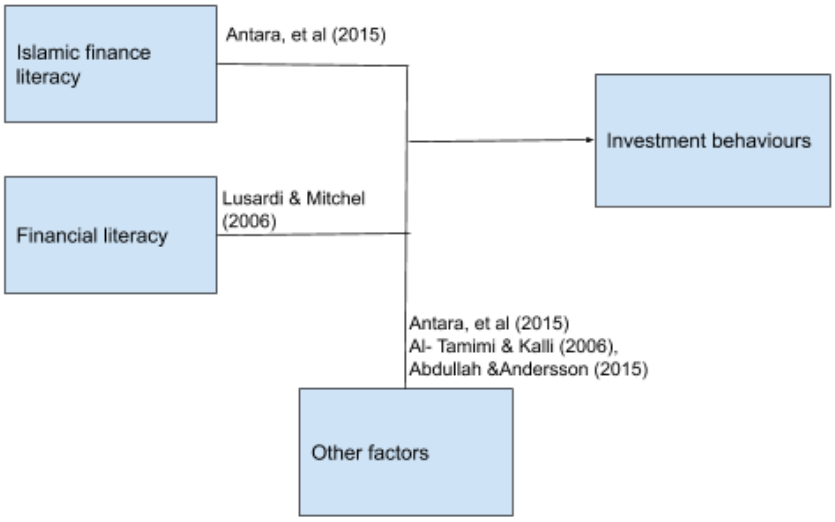

Figure 3. 1 Relationship among variables

Generation M theory mentioned by Janmohammed (2016) in her book, ‘‘Generation M’’, which stated that Muslim millennials in general share same traits in which they are faithful and opt for modern solution to overcome their needs will be investigated in terms of whether the Muslim millennials prefer digital solution to their financial needs (investment) that accordance with their faith. Other factors that might contribute to the decision-making process will be further investigated using factor analysis by partially adopted framework used by Al-Tamimi and Kalli (2006) and Abdullah and Anderson (2015). The study design is shown visually in Figure 3.2.

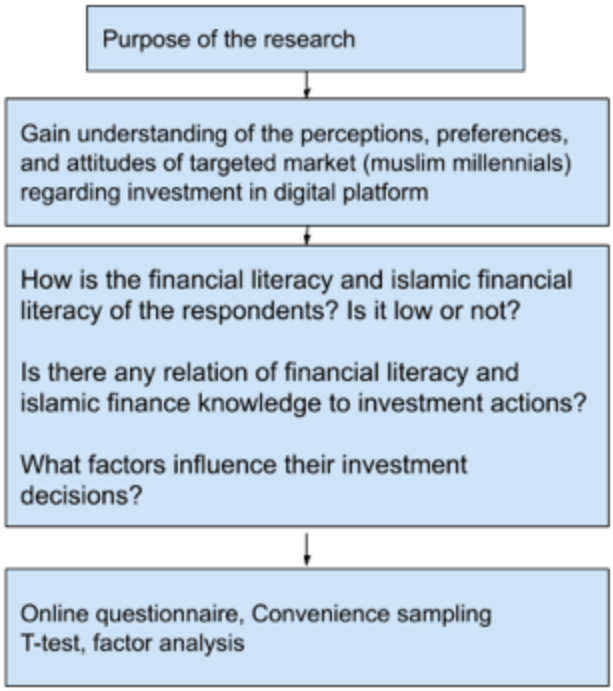

Figure 3. 2 Study design

The study will be conducted through the quantitative approach using online questionnaires with convenience sampling. Online questionnaire is chosen because its practicality to reach the target market which are millennials and its ability to reach a wider audience. Some respondents can help distributing the questionnaire link to their circles thus study can reach a bigger spectrum of data. Moreover, since the questionnaire is spread through online platform, convenience sampling is considered more suitable because the respondents are the one whose ability to choose whether to participate on the study or not.

3.2 Data Gathering Techniques

This study uses quantitative approach to reach the aim and objectives. Quantitative study is chosen looking at its ability to gather bigger data and capability to test hypothesis. As for the research tool, online questionnaire is used for several reason. Firstly, online questionnaire is perceived as suitable to better reach Indonesia's Muslim millennials that are heavy usage of internet especially social media (Lim, 2013). Secondly, convenience sampling is chosen because of its practicality in a given time and cost especially when the population of the study is very big making random sampling more difficult to be conducted.

3.2.1 Minimum sample

Malholtra (2007) gives some guideline on minimum quantity of sample required for marketing research which are around 200-500 samples depending on its purpose. Another approach to determine minimum sample is by looking at the sample size of similar research that had been conducted (Singh and Masuku, 2014). Review of the literature in this discipline can provide typical sample size that had been used (Ibid). Several comparisons of sample used in similar study is shown in table 3.1. Looking at these several aspects therefore the study aimed to have at minimum 200 samples.

Table 3. 1 Minimum Sample

Author	Tittle	Sample use
Taft, Hosein, et al. (2012)	The relation between financial literacy, financial wellbeing, and financial concerns.	103
Al-Tamimi and Kalli (2006)	Financial literacy and investment decisions of UAE investors	290
Kartini and Lantara (2014)	Financial literacy among university students in Indonesia	348
Sabri and Macdonald (2010)	Savings behaviour and financial problems among college students in Malaysia	350

3.2.2 Questionnaire Constructs

There are four constructs that will be assessed through quantitative analysis which are financial literacy, Islamic finance knowledge, factors regarding investment actions, and investment behaviours. The questionnaire is consisting of 47 questions that are categorized into four parts.
The first part of the questionnaire which consists of 7 questions will be deployed regarding demographic information such as age, education level, employment status, income, gender, religion, and relationship status.

The second part which consists of 15 questions will ask regarding Investment preferences. This part investigates factors that might contribute to investment decisions. Likert scale of 1-5 will be used in which 1 indicates strongly disagree, 2 indicates disagree, 3 indicates neutral, 4 means agree, and 5 means strongly agree.

The third part of the questionnaire which consists of 6 questions are about investment attitude. This part investigates the respondents' actions regarding investment such as their investment vehicle and so on. Here the respondents just check the options that suits their condition.

The fourth part consists of two category, first category consists of 8 questions regarding Islamic financial literacy measurement using exam type true or false statement. The second category in the fourth part of the questionnaire consists of 11 questions regarding financial literacy measurement also using exam type true or false statements.

3.3 Analysis tool

The data gathered will be processed with some steps as shown in figure 3.3. First, the data will be translated and coded into excel file. Secondly, the validity and reliability of the questionnaire will be tested. Validity test is conducted to see how accurate the measurement tool (the questionnaire) assessing the variables that want to be measured. Validity test will be conducted using Pearson Product Moment methods. As for reliability test will be conducted to see how reliable the questionnaire is in which it can be similar result if repetitions are occurred. The reliability test will be conducted using Cronbach alpha methods. Statistical software SPSS version 25 will be used to

help understand the data. Thirdly, if the sample size is less than 30, normality test will be conducted. However, since the minimum sample is determined to be above 200 as has been discussed in section 3.2, thus no numeric normality test will be taken instead a q-q plot of the data will be displayed to give general information of the data spreading.

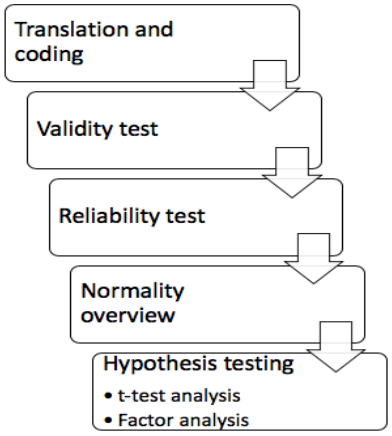

Figure 3. 3 Data Analysis Procedure

The next step is hypothesis testing. Hypothesis 1 and Hypothesis 2 will be tested by comparing the average score with the threshold number (67%) and see the significance using independent t-test. Varimax extraction methods will be used. Hypothesis 3 and Hypothesis 4 will be tested using independent t-test by comparing the result of financial literacy score and Islamic financial literacy score of respondents that already commit to invest and not. Hypothesis 5 will be tested using factor analysis. Principal component analysis is be used to find the fewest number of factors which explain the highest variance. Factors were then extracted when the eigen value is higher than 1 or when the scree plots show how many factors are extracted. Items with primary factor loadings more than 0,4 are judged adequate. Exploratory factor analysis using SPSS version 25 will be conducted.

Chapter 4 – Empirical Data

In this chapter, data collection process is explained as well as the demography and investment attitudes of the respondents. Preliminary test regarding statistical analysis such as validity test, reliability test, outlier and normality assumptions are also examined. As for the hypothesis analysis will be conducted in the next chapter.

4.1 Data Collection

Online survey had been published from 25 February 2019 until 4 March 2019. The survey got 431 responses. The data from total 52 respondents are not used because of incomplete answer (13 respondents), below the millennial age (28 respondents), and exceed the millennials age (12 respondents), leaving the data ready to be process to 379 respondents.

4.2 Demography of the Respondent

In table 4.1 the demography of respondents can be seen. All respondents are Muslims within the millennial age, which are people who born between 1981-1996 (Diamant, J. & Gecewicz, C., 2017). Most of them are educated people with bachelor and master's degree which is more than 90% of them in total. More than half of them are female and married.

Table 4. 1 Demography of the Respondents

Variable	**Category**	**Frequencies**	**Percentage**
Age	23-27 years old	229	60,42%
	28-32 years old	118	31,13%
	33-38 years old	32	8,43%
Last education	High school	6	1,58%
	Bachelor	245	64,64%
	Master's degree	109	28,76%

	Doctoral degree	2	0,52%
	Others	14	3,69%
Gender	Male	131	34,56%
	Female	248	65,43%
Marriage status	Married	245	64,64%
	Not married	134	35,35

4.3 Investment Attitudes Results

Table 4.7 shows the investment attitudes of the respondents. Less than half of the respondents (44,06%) already invest their money regularly. This shows that the majority of the respondents have not invested their income in regular basis. However, more than half of the respondents (54,62%) already do budgeting in which they have some allocations regarding their money. While less than half of the respondents (45,38%) already preparing for retirement funds.

As for the investment vehicle, mutual funds is the most popular option among other which is 18,47% respondents said that they already invest their money through it. Stocks investors follows later with proportions of 17,68%. Peer-to-peer lending and bonds are among the least popular investment vehicle with 8,97% and 7,92% respectively.

Table 4. 2 Investment Attitudes Summary

No	Topics	Yes	No	Percentage
1	Invest money in regular basis	167	212	44,06%
2	Invest money in stocks	67	312	17,68%
3	Invest money in mutual funds	70	309	18,47%
4	Invest money in bonds	30	349	7,92%

5	Invest money in P2P lending	34	345	8,97%
6	Put aside for retirement	172	327	45,38%
7	Do budgeting	207	64	54,62%

4.4 Preliminary Data Analysis

Before conducting hypothesis analysis, several preliminary tests are deployed such as reliability testing, validity test, and outlier test.

4.2.1 Reliability Testing

Validity and reliability of the questionnaire is measured using the unused data from 40 respondents. The reliability test is conducted using SPSS version 25 by calculating the Cronbach Alpha value of each of the variable. The threshold number for the reliability test is 0,6 (Malholtra, 2007).

Table 4. 3 Reliability Test Results

Variable	Cronbach Alpha Score	Result
Financial literacy	0,803	Reliable
Islamic financial literacy	0,639	Reliable*
Investment preferences	0,709	Reliable

At first, the Cronbach alpha score for Islamic financial literacy was below 0,6 threshold point which is 0,577 (appendix A). After item number 4 in the questionnaire is deleted, the Cronbach's alpha score increase to above the acceptance level which is 0,639. In consequences, the questionnaire to measure Islamic financial literacy will not examine item number 4 leaving the questionnaire consists of seven questions. The more detail calculations for these numbers can be found in appendix B.

4.5 Validity Test

The questions for measuring financial literacy, Islamic financial literacy, and investment preferences were taken from previous study which for have been repeatedly used in the past. However, several validation efforts still took place such as by face validity and construct validity. Face validity is conducted by asking two experts in the field about the items in questionnaire. As for the construct validity will be tested using SPSS 25 using Pearson product moment method by comparing the total score of each question to the total score of the overall questions. If the significant value is lesser than the threshold number 0,05 then the instrument can be said to be valid.

4.5.1 Financial literacy

All items in financial literacy measurement can be classified as valid like demonstrated in table 4.2 below whereas the significant score is under 0,05.

Table 4. 4 Financial Literacy Test Result

Question number	Correlation score	Significant value	Validity
1	0,386	0,014	Valid
2	0,38	0,016	Valid
3	0,417	0,007	Valid
4	0,717	0,00	Valid
5	0,699	0,00	Valid
6	0,394	0,012	Valid
7	0,71	0,00	Valid
8	0,696	0,00	Valid
9	0,61	0,00	Valid
10	0,653	0,00	Valid
11	0,539	0,00	Valid

4.5.2 Islamic Financial Literacy

All items in Islamic financial literacy measurement can be classified as valid like shown in table 4.3 whereas the significant score is under 0,05.

Table 4. 5 Islamic Financial Literacy Result

Question number	Correlation score	Significant value	Validity
1	0,499	0,02	Valid
2	0,34	0,042	Valid
3	0,688	0,00	Valid
5	0,561	0,00	Valid
6	0,643	0,00	Valid
7	0,447	0,006	Valid
8	0,488	0,003	Valid

4.5.3 Investment Preferences

All items in investment preferences questionnaires can be considered as valid like shown in table 4.4 whereas the significant score is under 0,05.

Table 4. 6 Validity Test for Investment Preferences Variable

Category	Correlation score	Significant value	Validity
1a	0,903	0,00	Valid
1b	0,802	0,00	Valid
1c	0,900	0,00	Valid
2a	0,892	0,00	Valid
2b	0,834	0,00	Valid
2c	0,872	0,00	Valid

3a	0,743	0,00	Valid
3b	0,776	0,00	Valid
3c	0,753	0,00	Valid
4a	0,779	0,00	Valid
4b	0,889	0,00	Valid
4c	0,544	0,00	Valid
5a	0,854	0,00	Valid
5b	0,824	0,00	Valid
5c	0,854	0,00	Valid

4.6 Outlier Test

Further preliminary test is regarding outlier of the data. Outlier can be seen as an observed result with a significantly different character than the rest of the data. Test of the outlier in the data is using statistical software SPSS Version 25.

4.6.1 Financial Literacy

For financial literacy part, no case is identified as outlier in the data as can be seen in figure 4.1. Therefore, all respondent's data can be used for further analysis.

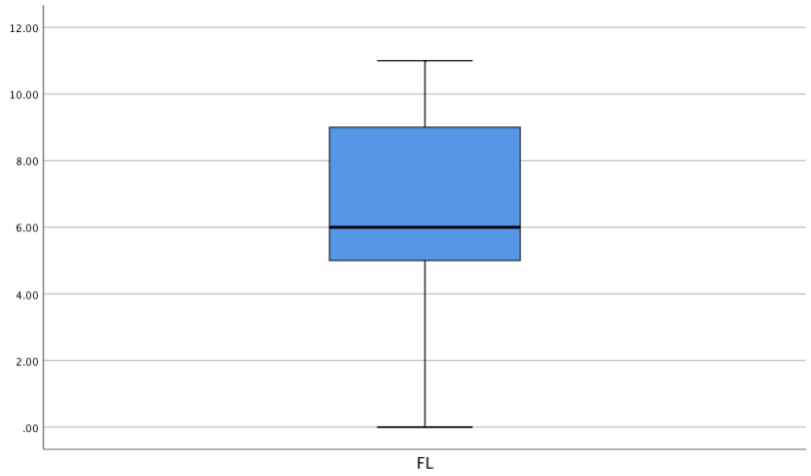

Figure 4. 1 Financial Literacy Outlier Test

4.6.2 Islamic Financial Literacy

As in Islamic Financial Literacy, 26 respondents are identified as outliers like shown in figure 4.2. However, it doesn't mean that we automatically need to discard them. We conduct a 1-sample t-test to see whether there is a significant difference between the average score of Islamic financial literacy without the outliers to the total average score the respondent which include the outliers. If the result shows that there is no significant difference between the two scores, then we can just include the outliers in our analysis.

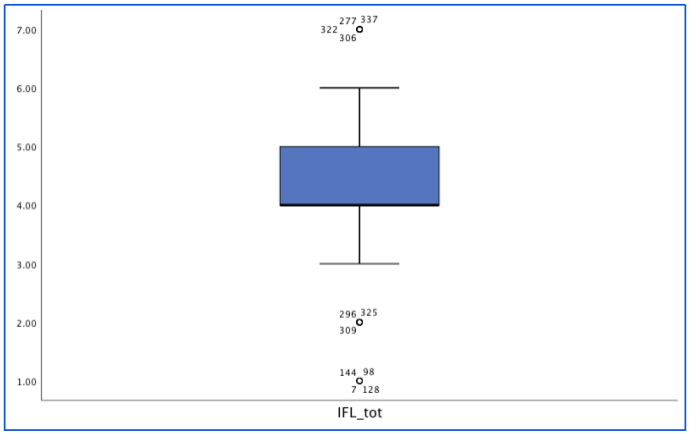

Figure 4. 2 Islamic Financial Literacy Outlier Test

The null hypothesis is there is no difference between the average score of the data with and without outliers. As our alternative hypothesis is there is significant difference from the score without outliers to the total mean score (with outliers) which is 4,348. The null hypothesis will be rejected if the significant value is less than 0,05 threshold number.

Table 4. 7 One sample t-test for Islamic Financial Literacy Outlier Test

One-Sample Test (Test Value=67)

FL Percentage	t	df	Sig(2-tailed)	Mean Difference	95% Confidence interval of the difference	
					Lower	Upper
	-6.33 7	378	.000	-7 .537	-9.88	-5.20

The result shown in table 4.5 in which the significant value of the 1-sample t-test is 0,237 which is greater than 0,05. Thus, the null hypothesis cannot be rejected. Therefore, the outliers can still be included to the further analysis.

4.7 Normality Test

Some sources stated that normally distributed data is not a major prerequisite to conduct a t-test (Lumley, et al., 2002). Especially for the large enough sample sizes (more than 30-40 samples) the violation of normality should not cause major problems (Pallant. J, 2007). Therefore, in this study we do not perform any numeric normality test but just a brief q-q plot for certain variables like shown in figure 4.3 and figure 4.4.

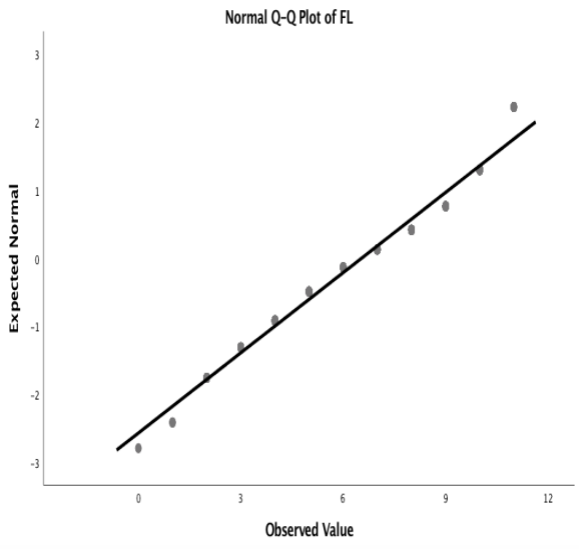

Figure 4. 3 Normality Test for Financial Literacy

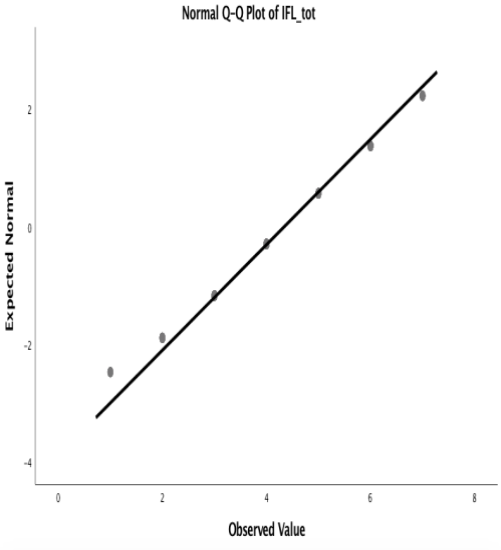

Figure 4. 4 Normality Test for Islamic Financial Literacy

CHAPTER 5 - Analysis and Discussion

In this chapter, the data gathered will be processed through statistical software SPSS and will be analyzed to answer the hypotheses of the research. In the end, discussion regarding the findings will be conducted.

5.1 Analysis of Hypothesis 1

Hypothesis 1 is formulated to examine the financial literacy score of respondents by looking at the average value of respondents' financial literacy score and comparing it the threshold number 67% that has been set earlier in theoretical framework. H1 stated that the financial literacy of Indonesian Muslim millennials is not adequate (<67%).

Table 5. 1 Financial Literacy Measurement Result

Number	Topics	Correct	Incorrect	Percentage correct
1	Interest compounding	271	108	71,50%
2	Inflation	339	340	89,44%
3	Risk diversification	292	87	77,04%
4	Function of stock market	239	140	63,06%
5	Knowledge of stock market	167	212	44,06%
6	Relationship between interest rates and bond prices	45	334	11,87%
7	Risk diversifications	170	209	44,85%
8	Bond and stocks risks	234	145	61,74%
9	Long period returns	187	192	49,34%
10	Highest fluctuations	274	105	72,30%

11	Risk diversifications	256	123	67,55%
Average score				**58,50%**

The first three questions regarding a general financial literacy knowledge have high percentage score. However, for the more advance the questions which are from question 4 to 11, the percentage correct score are varied. Most of the respondents failed to answer question number 6 regarding bond price and interest rates which is also considered as an advance financial literacy question. Less than one fifth, specifically only 11,87%, of the respondent understand about the relation of bond price and interest rates.

The average score for the respondent is 6,54 out of 11. At average, the respondent answer 58,50% of the questions correctly as can be seen in table 5.1. This number is below the threshold number 67%. The next step is to examine whether this number is significantly different from the threshold number using one sample t-test analysis.

Table 5. 2 One-sample Test for Hypothesis 1

One-Sample Test (Test Value=67)

FL Percentage	t	df	Sig(2-tailed)	Mean Difference	95% Confidence interval of the difference	
					Lower	Upper
	-6.33 7	378	.000	-7 .537	-9.88	-5.20

The t-test in table 5.2 shows that there is a significant difference (significant value or $p<0,05$) which means that the financial literacy of the respondent can be classified as lower than the threshold number.

5.2 Analysis of Hypothesis 2

In hypothesis 2 we would like to test whether the Islamic financial literacy of the respondents is inadequate. Firstly, the average score of the respondents is calculated and then compared with the

threshold number. Finally, one sample t-test analysis is conducted to determine the significance difference. Hypothesis 2 stated that the Islamic financial literacy of Indonesian Muslim millennials is not adequate (<67%).

Table 5. 3 Financial Literacy Score

Number	Topic	Correct	Incorrect	Percentage
IFL01	Basic Islamic financial	355	24	93,67%
IFL02	Basic Islamic financial	362	17	95,51%
IFL03	Investment	109	270	28,76%
IFL05	Basic Islamic financial	305	74	80,47%
IFL06	Investment	141	238	37,2%
IFL07	Investment	33	346	8,7%
IFL08	Basic Islamic financial	337	42	88,92%
Average score				**54,30%**

Some questions have relatively high percentage correct score which is above 80% especially regarding the basic Islamic financial matter like the prohibition of interest (question number 1), prohibition of deception or *gharar* in Arabic (question number 2), buy and sell requirement (question number 5) and loan payment (question number 8). However, regarding a more detail Islamic financial rules regarding investment (question number 3, 6, and 7) got relatively low score which are less than 40% for all the three questions. This result shows that respondent might already have basic knowledge regarding the general Islamic financial knowledge, but still far from adequate for the more advance knowledge especially regarding investment.

As for the overall overview, the average score for the respondents is 4,35 out of 7. At average, the respondent answer 54,30% of the questions correctly as can be seen in table 5.3. This number is below the threshold number 67%. The next step is to examine whether this number is significantly different from the threshold number using one sample t-test analysis.

Table 5. 4 One-sample t-test for Hypothesis 2

One-Sample Test (Test Value=67)

FL Percentage	t	df	Sig(2-tailed)	Mean Difference	95% Confidence interval of the difference	
					Lower	Upper
	-17663	378	.000	–12.64644	-14.054 3	-11.2386

The one sample t-test in table 5.4 shows that there is a significant difference (significant value or p >0,05) which means that the financial literacy of the respondent can be classified as lower than the threshold number.

5.3 Analysis of Hypothesis 3

Hypothesis 3 stated that there is a significant difference in financial literacy rate of Muslim millennials that already commit to do investment and not. From the survey, the average score of financial literacy score for respondents that already invest their money regularly is 66,68% whereas in average respondents that do not invest their money regularly has 53,77% financial literacy score.

In this section, we want to examine whether there is a significance different among the two groups using two sample t-test in SPSS. The result is shown in table 5.5

Table 5. 5 Independent Sample t-test for Hypothesis 3

Independent Samples Test

		Leveine's Test for Equality of Variances		t-test for Equality of Means						
FL score	Equal variances assumed	F	Sig	t	df	Sig(2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
	Equal variances not assumed	1.171	.280	5.602	377	.000	-12.91222	2.30500	-17.44449	-8.37995
				5.671	370.128	.000	-12.91222	2.37691	-17.38952	-8.43492

From table 5.5, it can be seen that the significant value (Sig 2-tailed) is less than 0,05 it means that there is significant different of the score between the two groups. This shows that people that invest regularly have significantly higher financial literacy score than respondents that are not invest regularly.

5.4 Analysis of Hypothesis 4

As a continuation from the above analysis, in this section we want to see whether there is a significant difference of Islamic financial literacy among respondents that already commit to invest regularly or not using independent sample t-test. Hypothesis 4 stated that there is a significant difference in Islamic financial literacy rate of Muslim millennials that already commit to do investment and not.

From the survey, the average Islamic financial literacy score for respondents that already commit to invest regularly and not is 55,61% and 54,3% respectively.

Table 5. 6 Independent Sample t-test for Hypothesis 4

Independent Samples Test

		Leveine's Test for Equality of Variances		t-test for Equality of Means						
FL score	Equal variances assumed	F	Sig	t	df	Sig(2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
	Equal variances not assumed	.034	.854	-1.565	377	.118	-2.252942	1.43942	-5.08322	.57737
				-1.575	364.390	.000	-2.25292	1.43023	-5.06546	.55961

The result from table 5.6 shows that the significant value (2 tailed) is 0,118 or higher than the threshold value 0,05. It means that there is no significant difference of Islamic financial literacy level between the respondent group that already invest regularly and not. On the other words, it shows that respondents who already invest regularly does not significantly have higher Islamic financial knowledge than their peers who are not committed on investing.

5.5 Analysis of Hypothesis 5

Hypothesis 5 stated that religious reasons and digital solutions are the most influencing factors of investment behaviour among Indonesia's Muslim millennials. To test this fifth hypothesis, we conduct an exploratory factor analysis using SPSS. Even though it is called exploratory, in the practical world some references are still needed to help develop the probable underlying variable. Principal Component Analysis (PCA) method is used to extract underlying factors from 15 variables.

5.5.1 Assumptions in Factor Analysis

Before conducting factor analysis several assumptions needs to be met. There are several basic assumptions before conducting factor analysis (Hair, et al., 2009) =

- Correlation among variables need to be strong enough which is shown by the Bartlett Test of Sphericity < 0,05.
- The overall score of Measure Sampling Adequacy (MSA) needs to be adequate >0,5. This score is shown from Kaiser-Meyer-Olkin (KMO) Measure of Sample Adequacy.
- Measure Sampling Adequacy (MSA) of each individual factor needs to be adequate (>0,5). The MSA score of each variable is evaluated.

To examine above assumptions KMO and Bartlett test are deployed which can be seen in table 5.7.

Table 5. 7 KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0,737
Bartlett' Test of Sphericity	Approx.- Chi-square	1401,076
	df	105
	Sig.	0,00

From table 4.7 it can be seen that the KMO score is 0,737 (>0,5) thus the sample can be concluded as enough to be proceeding to factor analysis. Furthermore, the Bartlett's test of Sphericity is almost 0 < 0,05 which means that there is significant correlation among variable. Last assumptions is by looking at the MSA score of each variable which is shown in table 5.8.

Table 5. 8 MSA Test for Each Variable

Variable	**Item**	**MSA score**
Sharia-compliance	V1	0,69
Religiosity	V2	0,55
Conformance to sharia	V3	0,65

Trust to Islamic financial institutions	V4	0,61
Conformance to religious authorities' decision	V5	0,64
Trust in Islamic financial system	V6	0,50
Trust in government financial authorities	V7	0,57
Reputation of firm member	V8	0,77
Reputation of the investment firm	V9	0,60
High return	V10	0,67
Get rich quick	V11	0,65
Affordable	V12	0,50
Online investment	V13	0,77
Digital based finance	V14	0,68
Online platform	V15	0,61

From table 5.8 it can be seen that all the variable is more than 0,5 thus factor analysis is suitable to be conducted.

5.5.2 Principal Component Analysis

From the data output in figure 5.1, it is identified that there are five components with high eigenvalue (more than 1) which means that there are five factors from the overall 15 variables. This means that 15 variables seems to measure 5 underlying factors. To see how these 5 factors, account the variance of the 15 variables, the r-square values or the communalities is analyzed. Variables that have low communalities (below 0,4) is considered as do not strongly contribute to the underlying factor and should be remove from the analysis. However, from the communalities score which is shown in table 5.8, all variables have communalities score higher than 0,4 which mean that all variables can be included in the analysis.

Table 5. 9 Total Variance Factor Analysis

Total Variance Explained

	Initial Eigen values			Rotation sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.214	2 1.42 3	1.42 3	2.283	15.222	15.222
2	2.603	17.354	38.778	2.165	14.431	29.653
3	1.418	9.452	48.2 30	1.858	12.384	42.038
4	1.189	7.930	56.159	1.641	10.940	52.978
5	1.063	7.086	63.246	1.540	10.268	63.246
6	.872	5.810	69.056			
7	.801	5.342	74.398			
8	.687	4.578	78.976			
9	.579	3.861	82.837			
10	.549	3.663	86.500			
11	.482	3.211	89.710			
12	.458	3.056	92.766			
13	.425	2.832	95.598			
14	.362	2.411	98.009			
15	299	1.991	100.000			

From the data results, it is shown that 15 variables probably measure 5 underlying factors as can be seen in figure 5.1. To check which variables, measure certain factors, Pearson correlations between the items and component is analyzed, these correlations is also called factor loadings.

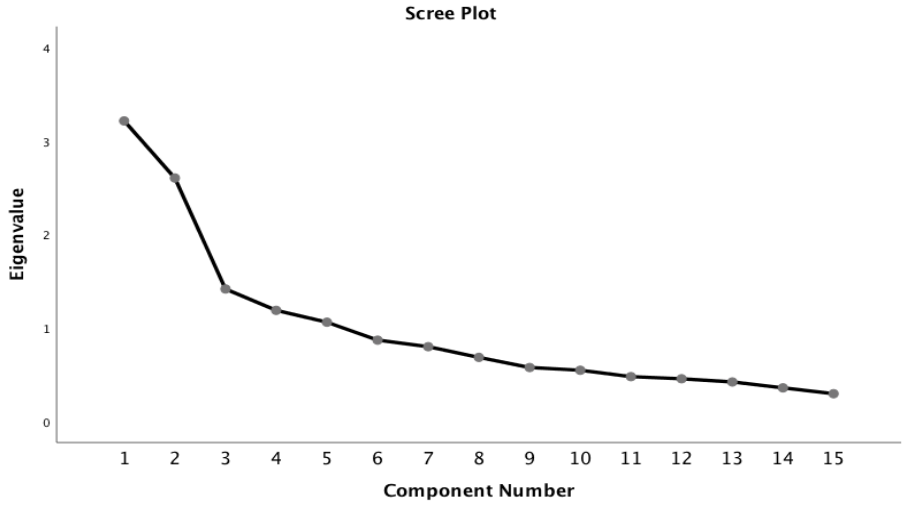

Figure 5. 1 Measurement of Variables

From the SPSS result for the factor analysis it can be seen which variables that loaded strongly to certain factors or components. From the result using extraction method of principal component analysis, with rotation method of varimax with Kaiser normalization it can be seen that there are five underlying factors with certain variables which is shown in table 5.10. After figuring out which variables contribute to certain factors, furthermore the five factors can be named accordingly which can be seen in table 5.11

Table 5. 10 Rotated Component Matrix

	1	2	3	4	5
Var_3	.747				
Var_8	.732				
Var_5	-682				
Var_1	.618				
Var_13		.858			
Var_14		-787			
Var_15		.765			
Var_6			.686		
Var_4			.685		
Var_2			.545		
Var_11				.784	
Var_10				.699	
Var_12				.646	
Var_9					.735
Var_7					.690

Table 5. 11 Factor Analysis Classifications

	Factor A	**Factor B**	**Factor C**	**Factor D**	**Factor E**
Variables	Variable 1	Variable 13	Variable 2	Variable 10	Variable 7
	Variable 3	Variable 14	Variable 4	Variable 11	Variable 9
	Variable 5	Variable 15	Variable 6	Variable 12	
	Variable 8				
Factor Name	**Conformance to values**	**Digital solutions**	**Religious belief**	**Accounting aspect**	**Firm image**

Variable 1, 3,5, and 8 were found to have high correlations with each other. Looking at these variables, it can be seen that these variables are related to trustworthiness that whether or not the investment options conforms to certain value such as whether certain investment products are believed as according to Islamic financial rules (*sharia*), according to financial authorities, and there is assurance from the firm members reputation. Conformance to value (trust) is given as the factor name for these group of variables.

Variable 13, 14, and 15 grouped together with strong correlation to each other. These group of variables are related to digital solutions such as preference of conducting investment through online platform and opt for digital solution to financial activity. Therefore, this group of variables is called as ‘digital solutions’.

The third group of variables are consisted of variable 2, 4 and 6 which are about religious reasons such as whether or not the respondents follow strict adherence to religious rulings, preference on Islamic finance system, and believe in halal certification from government’s Islamic financial authorities (DSN MUI). Therefore, this group of variables is named as ‘religious reasons’.

The fourth factors are consisted of variable 10, 11, and 12 related to accounting aspects of the investment products such as the rate of return, “get rich quick” mentality, and affordable investment. Therefore, this factor is named as ‘accounting aspect’. As for the fifth factors, it

consists of variable 7 and 9 which are related to firm image such as reputation of investment firm and firm that certified firm. Therefore, this factor is named as 'firm image'.

Furthermore, since the scale of the measurement for the variables are the same, factors that are perceived as more important for the respondent were examined by comparing the means of the variables within the same factors and compare the significance from the neutral point 3. Factors that are significantly higher than the neutral point, 3, can be perceived as important to the respondent.

Table 5. 12 Factor Analysis Means

No	Component	Factor Name	Variable number	Mean
1	Factor A	Conformance to value	1, 3, 5, 8	3,96
2	Factor B	Digital solutions	13, 14, 15	3,31
3j	Factor C	Religious belief	2, 4, 6	4,36
4	Factor D	Accounting aspect	10, 11, 12	2,99
5	Factor E	Firm image	7, 9	4,28

5.2.3 Factors classification

From the table 5.12 we can see that Factor C and Factor E which are religious beliefs and firm images are perceived as the most important factors influencing investment decision for the respondents with average score of 4,36 and 4,28 from the 5-point scale. As for the other factors which are Factor A, Factor B, and Factor D scored between 3 (neutral) to 4 (important) need to be examined further regarding whether they are significantly different from the neutral point to check whether those factors can be classified as important factors or not. Therefore, the next step is to test whether Factor A (3,96), Factor B (3,31), and Factor D (2,99) are significantly different from the neutral point 3. Independent sample t-test is used to see whether the mean of factor A, B and D significantly different from 3.

Table 5. 13 Independent Sample t-test

	Factor name	Mean	Sig. (2-tailed)	Mean difference	Status
Factor A	Conformance to value	3,96	0,00	0,957	Favorable
Factor B	Digital solutions	3,31	0,00	0.311	Favorable
Factor D	**Accounting aspect**	2,99	**0,978**	-0,001	**Neutral**

From Table 5.13 Factor D has significance value of 0,978 (>0,05) which means Factor D with average mean of 2,99 can be concluded as significantly different from 3 thus should be classified as having neutral value. As for the rest of the mean score are significantly different from the neutral 3 point which mean they are considered favorable or important factors.

To sum up, it can be said that Factor C (religious belief), Factor E (firm image), Factor A (conformance to value) and Factor B (Digital solutions) perceived as important whereas Factor D (accounting aspect) is perceived as neutral aspect or not the high valued factor that influence the investment decision. Therefore, our fifth hypothesis, which is religious reasons and digital solutions are the most influencing factors of investment behaviour among Indonesia's Muslim millennials, is partly supported. Religious reason is found to be the most influencing factors of investment behaviours whereas digital solutions is not the highest influencing factor while still perceived as important. The visual explanation can be seen in figure 5.2.

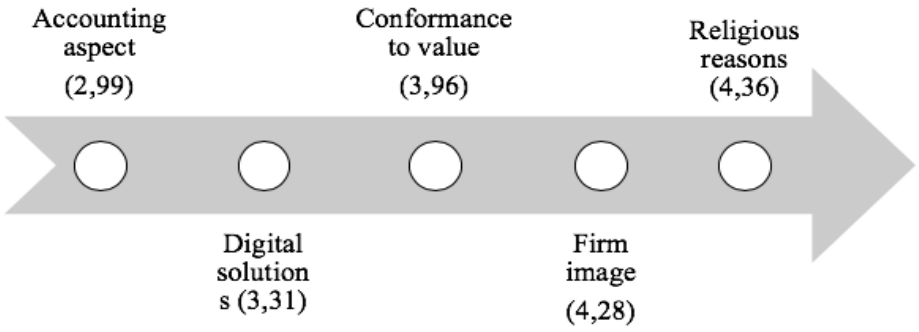

Figure 5. 2 Religious Influence

5.6 Discussion

Financial literacy and Islamic financial literacy score of the respondents, which are 58,5% and 54,3% respectively, can be seen as having not met the threshold (<67%) thus cannot be considered as high. This finding is according to several other studies such as research conducted by Al-Tamimi and Kalli (2006) regarding financial literacy of UAE investors is found to be inadequate.

However, hypothesis 3 shows that respondents who invest regularly have significantly higher financial literacy compared to others who are not investing regularly. On the other hand, hypothesis 4 shows that there is no significant difference of Islamic financial literacy score among respondents who invest regularly or not. This indicates that investors tend to have higher financial literacy but not Islamic financial literacy per se. Several reasons might motivate this condition such as Muslim millennials investors presumably already did some research regarding the permissibility of certain investment product before starting the investment process thus the investment activity conducted later barely yield on additional knowledge. Another possible explanation for this is the Muslim millennials investors have relied their judgement regarding permissibility of certain investment products to some authorized parties such as Islamic Financial Authorities (DSN MUI) that make some certification and socialization regarding the sharia view on certain investment products.

However, on a deeper examination regarding the Islamic financial literacy measurement, it is also found that respondents are lack in knowledge in questions regarding investment that according to Islamic ruling. From three questions that related to sharia-compliant investment, respondents who answers both three questions correctly are less than 10%. This indicate the low Islamic financial literacy among respondent especially regarding investment that according to Islamic ruling. On the other hand, from the factor analysis, it is shown that religious reasons is the most important factor before conducting investment. This is a paradox finding to hypothesis 4 in which respondents perceived investment that is according to Islamic rulings as important but the Islamic financial literacy results showed that they do not have adequate knowledge regarding the specific ruling. This finding shows that certification regarding sharia matter on investment products might be necessary to help the target market on making investment decisions.

This finding also can be beneficial to the industry actors such as companies who targeted Muslim millennials as customers to better shape their value propositions to resonate better to the targeted customers as well as to better understand their needs and preferences. For example, financial technology companies can put more emphasis on giving assurance regarding the sharia-accordance of their investment products instead of just persuading them with financial benefits. Certification from legitimate Islamic financial institution might be an important aspect to guarantee the permissibility of the investment products offered. Especially, looking at the inadequacy of Islamic financial literacy of Muslim millennials especially regarding sharia-accordance investment, they might be relying more on the statement from related sharia institutions.

CHAPTER 6 - Conclusion

This chapter will conclude the findings from the data analysis to answer the research questions and hypothesis formulated.

6.1 Conclusion

The financial literacy and Islamic financial literacy rate of our respondents are below the threshold number (67%) thus we can say that the financial and Islamic financial literacy of the respondents are insufficient. Only 58,5% of the questions are answered correctly for the financial literacy part and 54,30% for the Islamic financial literacy part.

Furthermore, we find that there is a significant difference in the financial literacy rate of respondents that already invest regularly but no significant difference of Islamic financial literacy rate among the two groups. Respondents that commit to invest regularly have significantly higher financial literacy score rather than respondents that do not invest regularly which are 66,68% and 53,77% respectively.

Religious reasons and firm image are the two most important factors behind investment decision for the respondent whereas digital solutions are found preferable even though not contribute as the highest influencing factor to conduct an investment. Accounting aspects such as rate of return has a neutral score which mean that the respondents do not consider them as the determining factor to decide investment products, instead they consider the religious aspects and several other factors in advance.

6.2 Implications

Looking at the higher financial literacy score among investors but relatively insignificant difference regarding Islamic financial literacy compare to the non-investor group, the company can focus more on giving education regarding financial literacy to boost the investment awareness. In parallel, getting certification regarding sharia-compliant investment might be needed since

religious reasons is considered as important but the target market have considerably inadequate knowledge regarding sharia-compliant investment.

Moreover, these findings can give beneficial insights for companies that want to serve the Muslim millennials segment to better understand them and accommodate their preferences. For example, by knowing that religious reasons is the most important thing, companies can adjust their value propositions and communicate their product offerings better. Moreover, even though respondents perceive religious reason as important factor, the data shows that they have limited Islamic financial knowledge especially regarding sharia-compliant investment. Therefore, collaboration with Islamic financial institution might be seen as strategic move because their certification can be useful to give the Indonesia's Muslim millennials reassurance of the eligibility and security of the financial products in term of sharia point of view.

Furthermore, since firm image and conformance to value (trustworthiness) is perceived as important factors before conducting investment, companies can seek the certification to the government financial institution regarding their practices therefore the Indonesia's Muslim millennials can trust the company. Moreover, digital solutions are also perceived as important therefore developing the digital platform can be a strategic move for the company while still consider the other important factors.

6.3 Future research

Complementary qualitative research can be useful especially to better understand the motivations behind the respondents' decisions of investing or not. By doing a qualitative research hopefully a clearer and deeper picture of factors behind the resistance of investment can be found, as well as the things that prevent them from increasing the financial literacy and Islamic financial literacy level. By knowing these aspects better, industry actors can better solve the problem regarding low financial literacy level as well as boosting the awareness to conduct investment.

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APPENDIX

Reliability Test Financial Literacy

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.803	.800	11

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
FL_Q1	5.8250	7.379	.384	.470	.796
FL_Q2	5.5500	7.844	.376	.321	.796
FL_Q3	5.7250	7.743	.272	.324	.807
FL_Q4	5.8000	6.882	.598	.579	.773
FL_Q5	6.0250	6.897	.583	.480	.774
FL_Q6	6.2750	7.948	.285	.248	.803
FL_Q7	5.9750	6.692	.658	.642	.765
FL_Q8	5.7250	7.076	.555	.534	.778
FL_Q9	5.9250	7.251	.423	.605	.792
FL_Q10	5.7250	7.179	.509	.727	.783
FL_Q11	5.7000	7.395	.432	.531	.791

APPENDIX B

Reliability test Islamic financial literacy with 8 questions

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.577	.575	8

Reliability test Islamic financial literacy with 7 questions, deleting the item number 4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.638	.639	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
VAR00001	3.8000	1.614	.330	.308	.607
VAR00003	4.2000	1.269	.434	.236	.576
VAR00005	3.8000	1.545	.417	.474	.580
VAR00006	4.1667	1.247	.455	.243	.566
VAR00007	4.6000	1.766	.286	.115	.620
VAR00008	3.7333	1.720	.359	.214	.605
VAR00002	3.7000	1.872	.235	.375	.634

APPENDIX C

Reliability for Investment Preferences

Category 1 & Category 2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.833	.840	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.802	.841	3

Category 3 & Category 4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.606	.596	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.613	.635	3

Category 5

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.787	.801	3

APPENDIX D

Validity Financial Literacy

Correlations													
		VAR00001	VAR00002	VAR00003	VAR00004	VAR00005	VAR00006	VAR00007	VAR00008	VAR00009	VAR00010	VAR00011	VAR00012
VAR00001	Pearson Correlation	1	0.154	0.245	0.211	.354*	0.2	.533**	0.134	0.102	0.134	0.183	.386*
	Sig. (2-tailed)		0.342	0.128	0.192	0.025	0.216	0	0.411	0.531	0.411	0.259	0.014
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00002	Pearson Correlation	0.154	1	0.082	.332*	0.154	0.159	.342*	0.247	0.076	0.247	.444**	.380*
	Sig. (2-tailed)	0.342		0.613	0.036	0.342	0.328	0.031	0.124	0.643	0.124	0.004	0.016
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00003	Pearson	0.245	0.082	1	0.169	0.312	0.122	0.263	0.167	.436**	-0.071	-0.159	.417**

	Correlation												
	Sig. (2-tailed)	0.128	0.613		0.297	0.05	0.452	0.101	0.304	0.005	0.661	0.328	0.007
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00004	Pearson Correlation	0.211	.332*	0.169	1	.316*	0.181	.389*	.507**	.361*	.620**	.332*	.717**
	Sig. (2-tailed)	0.192	0.036	0.297		0.047	0.264	0.013	0.001	0.022	0	0.036	0
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00005	Pearson Correlation	.354*	0.154	0.312	.316*	1	.372*	.390*	0.312	.510**	0.312	0.274	.699**
	Sig. (2-tailed)	0.025	0.342	0.05	0.047		0.018	0.013	0.05	0.001	0.05	0.087	0
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00006	Pearson Correlation	0.2	0.159	0.122	0.181	.372*	1	0.042	0.122	0.28	0.122	0.102	.394*
	Sig. (2-tailed)	0.216	0.328	0.452	0.264	0.018		0.796	0.452	0.08	0.452	0.531	0.012
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00007	Pearson	.533**	.342*	0.263	.389*	.390*	0.042	1	.482**	.402*	.373*	.445**	.710**

	Correlation												
	Sig. (2-tailed)	0	0.031	0.101	0.013	0.013	0.796		0.002	0.01	0.018	0.004	0
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00008	Pearson Correlation	0.134	0.247	0.167	.507**	0.312	0.122	.482**	1	0.218	.643**	.330*	.696**
	Sig. (2-tailed)	0.411	0.124	0.304	0.001	0.05	0.452	0.002		0.176	0	0.038	0
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00009	Pearson Correlation	0.102	0.076	.436**	.361*	.510**	0.28	.402*	0.218	1	0	0.056	.610**
	Sig. (2-tailed)	0.531	0.643	0.005	0.022	0.001	0.08	0.01	0.176		1	0.731	0
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00010	Pearson Correlation	0.134	0.247	-0.071	.620**	0.312	0.122	.373*	.643**	0	1	.574**	.653**
	Sig. (2-tailed)	0.411	0.124	0.661	0	0.05	0.452	0.018	0	1		0	0
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00011	Pearson	0.183	.444**	-0.159	.332*	0.274	0.102	.445**	.330*	0.056	.574**	1	.539**

	Correlation												
	Sig. (2-tailed)	0.259	0.004	0.328	0.036	0.087	0.531	0.004	0.038	0.731	0		0
	N	40	40	40	40	40	40	40	40	40	40	40	40
VAR00012	Pearson Correlation	.386*	.380*	.417**	.717**	.699**	.394*	.710**	.696**	.610**	.653**	.539**	1
	Sig. (2-tailed)	0.014	0.016	0.007	0	0	0.012	0	0	0	0	0	
	N	40	40	40	40	40	40	40	40	40	40	40	40
cant at th													
cant at t													

Validity

Category 1

Correlations

		valid_v1a	valid_v1b	valid_v1c	valid_v1_tot
valid_v1a	Pearson Correlation	1	.222	.232	.684**
	Sig. (2-tailed)		.168	.149	.000
	N	40	40	40	40
valid_v1b	Pearson Correlation	.222	1	.137	.669**
	Sig. (2-tailed)	.168		.398	.000
	N	40	40	40	40
valid_v1c	Pearson Correlation	.232	.137	1	.691**
	Sig. (2-tailed)	.149	.398		.000
	N	40	40	40	40
valid_v1_tot	Pearson Correlation	.684**	.669**	.691**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	40	40	40	40

**. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX E

Willingness to use the product

Number	Willingness to use the product	Frequencies	Percentage
1	Haven't decided yet	82	21,63%
2	No, I prefer manage my own investment portfolio	14	3,69%
3	No, I prefer to meet real human advisor	29	7,65%
4	Yes, but with opportunity to meet real advisor	175	46,17%
5	Yes of course, practise and easy	79	20,84%

Willingness to pay

Number	Subscription price range	Frequencies	Percentage
1	Free	22	5,8%
2	< Rp 100,000 a year	95	25%
3	Rp 299,999 - 100,000 a year	122	32,19%
4	Rp 499,000 - 300,000 a year	56	14,77%
5	> Rp500,000 a year	74	19,52%
6	Haven't decided yet	10	2,63%